Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Hongtei E. Tseng — Group Art Unit: 3683

Serial Number: 10/708,680 — Examiner: Graham, Matthew C.

Filed: 03/18/2004

For: METHOD AND APPARATUS TO ENHANCE BRAKE-STEER OF A VEHICLE USING A CONTROLLABLE SUSPENSION COMPONENT

Attorney Docket No: 81095830 (FGT 1912 PA)

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Donna Kraft
Signature

Date: 8-1-2006 — DONNA KRAFT

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
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Sir:

The following Appeal Brief is submitted pursuant to the Notice of Appeal dated June 2, 2006, for the above-identified application.

I. Real Party in Interest

The real party in interest in this matter is Ford Global Technologies, LLC, which is a wholly owned subsidiary of Ford Motor Company both in Dearborn, Michigan (hereinafter "Ford").

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-30 stand rejected.

IV. Status of Amendments

There have been no Amendments filed after the final rejection.

V. Summary of Claimed Subject Matter

Claims 1 and 17 are the independent claims in the case. Claim 1 can best be understood with reference to paragraphs 91-105, inclusive, of Appellants' specification, and by reference to Figure 10. In general, Claim 1 is directed to a method for controlling an automotive vehicle having a controllable suspension component, and wherein the vehicle has a first turning radius. The method includes applying brake-steer to at least one wheel to provide a second turning radius less than the first turning radius and generating a suspension control signal in response to applying the brake-steer. Finally, at least one wheel coupled to the controllable suspension component to particularly provide a third turning radius of the vehicle less than the second turning radius. These three turning radii are shown in Figure 1 of Appellants' specification.

As set forth in Appellants' specification at paragraph 92, sensors are monitored at step 207 of Figure 10, and at step 212 outputs of various vehicle systems are also monitored (paragraph 94). At paragraph 97, vehicle normal force at each of the wheels and the static loading of the wheels may be adjusted. This step is an optional step for applying brake-steer. The suspension controls are used to adjust normal forces at the individual corners of the vehicle.

In Appellants' specification at paragraph 99, which describes step 218 of Figure 10, brake-steer is applied to the vehicle. Brake-steer may take the form of applying brakes, or applying a differential torque by providing one wheel with a greater positive torque than a second wheel.

In Appellants' specification at paragraph 103, vehicle loading is described as being a factor in the amount of brake-steer to be applied.

In paragraph 105 of Appellants' specification, various suspension modifications are described, including a compliant component of a Hotchkiss suspension or adjustable toe link in an independent suspension. The use of articulation of a wheel is described as enhancing a turning radius of the vehicle in connection with brake-steer.

Independent Claim 17 sets forth a method corresponding to the apparatus claimed within Claim 1. As such, any further explanation of Claim 17 would be excessively redundant.

VI. Grounds of Rejection to be Reviewed on Appeal

The following issue is presented in this appeal:

1. Are Claims 1, 2, 4-9, 11, 12, 15, 17-21, 27, 29, and 30 properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman (US 6, 612,394) in view of Fukushima (US 4,903,983)?

2. Are Claims 3 and 23 properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Ritz (US 6,588,858)?

3. Are Claims 10 and 22 properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Kreuger (US 6,481,806)?

4. Are Claims 13 and 24 properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Nordstrom (US 4,227,716)?

5. Are Claims 14, 25 and 26 properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Lee (US 5,560,640)?

6. Are Claims 16 and 28 properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Kring (US 5,549,319)?

VII. Argument

***Claims 1, 2, 4-9, 11, 12, 15, 17-21, 27, 29, and 30 are not* properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman (US 6, 612,394) in view of Fukushima (US 4,903,983).**

Claims 1, 2, 4-9, 11, 12, 15, 17-21, 27, 29, and 30

Claim 1 is directed to a method of controlling an automotive vehicle having a controllable suspension component that includes applying brake-steer and articulating at least one wheel coupled to the controllable suspension component to provide a third turning radius of the vehicle less than the second turning radius. Appellants respectfully submit that neither the Fukushima reference nor the Wessman reference teach or suggest articulating a suspension component to reduce the turning radius of the vehicle. This is illustrated in Figs. 16 and 17 of the present application. The articulating movement is illustrated by the arrows 204. The Fukushima reference merely provides changes to a damper to adjust the center of gravity of the vehicle and not to articulate at least one wheel. While the suspension appears to be moved in a vertical direction, in the Fukushima reference no articulating of at least one wheel is provided.

Claim 17 recites that the controllable suspension component is actuated in response to a control signal and reduces the turning radius of the vehicle in response to the suspension control signal. The suspension control signal is generated in response to a brake-steer condition. While the Wessman reference teaches a vehicle with a suspension (all vehicles have suspensions), no teaching or suggestion is provided in the Wessman reference for a suspension that is controlled to reduce the turning radius of the vehicle in response to brake-steer. The Fukushima reference also does not teach or suggest brake-steer and does not teach generating a suspension control signal in response to the brake-steer condition. Therefore, neither of these two references teach or suggest the combination set forth in Claim 17.

Likewise, Claims 2, 4-9, 11, 12, 15, 18-21, 27, 29, and 30 are dependent upon allowable independent claims and are thus believed to be allowable for the same reasons set forth above.

Claims 3 and 23 are not properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of *Ritz (US 6,588,858)*.

Claims 3 and 23

Claim 3 recites a drive torque to a wheel relative to another wheel. While changing drive torque is illustrated in the Ritz reference, no teaching or suggestion is provided for the missing elements of controlling a suspension component. Therefore, Appellants respectfully request the Board to direct the Examiner to withdraw the rejection of Claims 3 and 23.

Claims 10 and 22 are not properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Kreuger (US 6,481,806).

Claims 10 and 22

Claims 10 and 22 recite determining a parking mode in response to a driver actuated switch. The Examiner states, "Krueger teaches the use of a pedal brake switch 82 to sense a brake signal during a brake application." However, Claim 10 recites detecting a parking mode comprising detecting a parking mode in response to a driver-actuated switch. No teaching or suggestion is provided for this in the *Krueger* reference. Appellants respectfully request the Board to direct the Examiner to withdraw the rejection of Claims 10 and 22.

Claims 13 and 24 are not properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Nordstrom (US 4,227,716).

Claims 13 and 24

Although the Nordstrom reference teaches a Hotchkiss suspension, no teaching or suggestion is provided for articulating a Hotchkiss suspension in response to brake-steer. Therefore, Appellants respectfully request the Board to direct the Examiner to withdraw the rejection of Claims 13 and 24 as well.

Claims 14, 25 and 26 are not properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Lee (US 5,560,640).

Claims 14, 25 and 26

Although the reference cites a controllable bushing, no teaching or suggestion is provided for using a controllable bushing to reduce the turning radius of the vehicle in response to brake-steer. Therefore, the Lee reference does not teach the elements missing from the

base claims and therefore, Appellants respectfully request the Board to direct the Examiner to withdraw the rejection of Claims 14, 25 and 26.

Claims 16 and 28 are not properly rejected under 35 U.S.C. §103(a) as being unpatentable over Wessman in view of Fukushima and further in view of Kring (*US 5,549,319*).

Claims 16 and 28

The Kring reference also does not teach or suggest the elements missing from the base claims and therefore, Appellants respectfully request the Board to direct the Examiner to withdraw the rejection of Claims 16 and 28.

VIII. Claims Appendix

A copy of each of the claims involved in this appeal, namely Claims 1-30 is attached as a Claims Appendix.

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

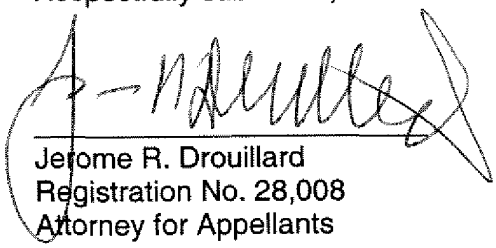
None.

XI. Conclusion

For the foregoing reasons, Appellants respectfully request that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Please charge any fees required in the filing of this appeal to deposit account 06-1510.

Respectfully submitted,



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CLAIMS APPENDIX

1. A method of controlling an automotive vehicle having a controllable suspension component, said vehicle having a first turning radius comprising:

applying brake-steer to at least one wheel to provide a second turning radius less than the first turning radius;

generating a suspension control signal in response to applying brake-steer; and

articulating at least one wheel coupled to the controllable suspension component to provide a third turning radius of the vehicle less than the second turning radius.

2. A method as recited in claim 1 wherein applying brake-steer comprises applying at least one brake at a first wheel.

3. A method as recited in claim 1 wherein applying brake-steer comprises applying an increased drive torque to a second wheel relative to a first wheel.

4. A method as recited in claim 1 applying brake-steer comprises increasing a normal load on a rear wheel.

5. A method as recited in claim 1 applying brake-steer comprises increasing a normal load on a front wheel.

6. A method as recited in claim 1 further comprising detecting a parking mode and applying brake-steer in response to a parking mode.

7. A method as recited in claim 6 wherein detecting a parking mode *comprises detecting a parking mode in response to a vehicle speed.*

8. A method as recited in claim 6 wherein detecting a parking mode comprises detecting a parking mode in response to a steering wheel angle.

9. A method as recited in claim 6 wherein detecting a parking mode comprises detecting a parking mode in response to a map correlating vehicle speed and a steering wheel rate to a parking/non-parking condition.

10. A method as recited in claim 6 wherein detecting a parking mode comprises detecting a parking mode in response to a driver-actuated switch.

11. A method as recited in claim 1 wherein articulating one wheel comprises *articulating two wheels.*

12. A method as recited in claim 11 wherein the two wheels are coupled to a solid axle.

13. A method as recited in claim 1 wherein articulating at least one wheel coupled to the controllable suspension component comprises articulating using a Hotchkiss *suspension.*

14. A method as recited in claim 1 wherein articulating at least one wheel coupled to the controllable suspension component comprises articulating using an electrically controllable bushing.

15. A method as recited in claim 1 wherein articulating at least one wheel coupled to the controllable suspension component comprises a solenoid locking mechanism.

16. A method as recited in claim 1 wherein articulating at least one wheel coupled to the controllable suspension component comprises a locking mechanism with a *compliant rear suspension mount.*

17. A vehicle having a turning radius comprising:

a suspension comprising a controllable suspension component; and

a controller coupled to the controllable component, said controller programmed to determine a brake-steer condition and generate a suspension control signal in response to the brake-steer condition,

said controllable suspension component actuating in response to the control signal and reducing the turning radius of the vehicle in response to the suspension control signal.

18. A vehicle as recited in claim 17 wherein said controller is programmed to determine a brake-steer condition in response to a parking mode.

19. A vehicle as recited in claim 17 wherein said controller determines a parking mode in response to a vehicle speed.

20. A vehicle as recited in claim 17 wherein said controller determines a parking mode in response a steering wheel angle.

21. A vehicle as recited in claim 17 wherein said controller determines a parking mode in response to a vehicle speed and a steering angle.

22. A vehicle as recited in claim 17 wherein said controller determines a parking mode in response to a driver-actuated switch.

23. A vehicle as recited in claim 17 wherein said controller in a parking mode controls a first positive torque to a first driven wheel and simultaneously controls a second positive torque greater than the first positive torque to a second wheel so that the turning radius of the vehicle is reduced.

24. A vehicle as recited in claim 17 wherein said suspension comprises a Hotchkiss suspension.

25. A vehicle as recited in claim 17 wherein said suspension component comprises an electrically controllable bushing.

26. A vehicle as recited in claim 17 wherein said suspension component comprises a toe link coupled to an electrically controllable bushing.

27. A vehicle as recited in claim 17 wherein said suspension component comprises a solenoid locking mechanism.

28. A vehicle as recited in claim 17 wherein said suspension component comprises a locking mechanism with a compliant rear suspension mount.

29. A vehicle as recited in claim 17 wherein said controllable suspension component reduces the turning radius of the vehicle by articulating at least one wheel.

30. A vehicle as recited in claim 17 wherein said controllable suspension component reduces the turning radius of the vehicle by articulating at two wheels on an axle.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.